

PATENT APPLICATION

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q66581

Takeshi FUNAHASHI

Appln. No.: 10/044,962

Group Art Unit: 2882

Confirmation No.: 3096

Examiner: Ashutosh UPRETI

Filed: January 15, 2002

For: METHOD AND APPARATUS FOR COMPRESSING IMAGE SIGNALS

AMENDED APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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I. REAL PARTY IN INTEREST

The real party in interest is FUJI PHOTO FILM CO. LTD., by virtue of an assignment executed by Takeshi Funahashi (Appellant, hereafter), on December 21, 2001, and recorded by the Assignment Branch of the U.S. Patent and Trademark Office on January 15, 2002 (at Reel 012502, Frame 0304).

Appellant further advises that since the recordation of assignment, the assignee has undergone a name change and restructuring such that the new name of the holding entity is FUJIFILM CORPORATION.

II. RELATED APPEALS AND INTERFERENCES

To the knowledge and belief of Appellants, the Assignee, and the undersigned, there are no other appeals or interferences before the Board of Appeals and Interferences that will directly affect or be affected by the Board's decision in the instant Appeal.

III. STATUS OF CLAIMS

The instant application was filed with claims 1-6. Claims 1, 2, 5, 7-11 and 13-15 are currently pending in the application. Claims 3, 4, 6 and 12 were canceled.

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Adachi (U.S. 5,151,795). Claims 5, 7-11 and 13-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Adachi in view of Ohara (U.S. Patent Application Publication Number 2001/0038707). With entry of the amendment filed on March 20, 2006, the subject matter of claims 3 and 4 are now included in claims 1 and 2, respectively. Claims 3 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Adachi in view of Ohara. Therefore, it is submitted that this appeal is directed to the rejection of all pending claims under §103 over the combination of Adachi and Ohara.

The rejections of claims 1, 2, 5, 7-11 and 13-15 are being appealed.

IV. STATUS OF AMENDMENTS

The amendments to claims 1, 2, 5, 7, 11 and 15 submitted on March 20, 2006 in response to the Final Office Action have been entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention relates to a method and apparatus for compressing image signals.

According to claim 1 of the invention, disclosed is a method of compressing image signals, comprising the steps of:

- i) obtaining a plurality of radiation image signals respectively representing a plurality of radiation images of an object, which radiation images have been formed with several kinds of radiation having different energy distributions¹,
- ii) obtaining an energy subtraction image signal, which has been formed from the plurality of the radiation image signals², and
- iii) performing reversible compression processing on the plurality of the radiation image signals and irreversible compression processing on the energy subtraction signal³,

wherein the energy subtraction image signal is compressed with a compressibility higher than the compressibility with respect to each of the radiation image signals⁴.

¹ Specification, page 11, lines 17-18.

² *Id.*, page 11, lines 22 and 23.

³ *Id.*, page 12, lines 1-4.

⁴ *Id.*, page 15, line 13 - page 16, line 7.

According to claim 2 of the invention, disclosed is an apparatus for compressing image signals wherein:

a plurality of radiation image signals respectively representing a plurality of radiation images of an object, which radiation images have been formed with several kinds of radiation having different energy distributions, are obtained⁶,

an energy subtraction image signal, which has been formed from the plurality of the radiation image signals, is obtained⁷, and

compression processing is performed on the plurality of the radiation image signals and the energy subtraction image signal are compressed⁸.

the apparatus comprising:

a) radiation image signal compressing means for performing compression processing on each of the radiation image signals with a reversible first compressing process⁹, and

⁶ Specification, page 11, lines 17-18.

⁷ *Id.*, page 11, lines 22 and 23.

⁸ *Id.* page 12, lines 1-4.

⁹ *Id.*, page 11, line 24 - page 12, line 4 and FIG. 1, element 20 (compression means A).

b) energy subtraction image signal compressing means for performing compression processing on the energy subtraction image signal with an irreversible second compressing process¹⁰.

a compressibility in the second compressing process being higher than the compressibility in the first compressing process¹¹.

The apparatus contains a radiation image signal compressing means for compressing each of the high and low energy radiation image signals with a reversible first compressing process, and an energy subtraction image signal compressing means for compressing the energy subtraction image signal with an irreversible compression process.¹² The irreversible compression process is able to be compressed to a greater degree than the reversible compression process.¹³

According to claim 8 of the invention, it is disclosed that wherein the compression processing corresponding to the energy subtraction image signal is represented by $1/n$, where n is an integer greater than or equal to 10.¹⁴

¹⁰ Specification, page 12, lines 4-8 and FIG. 1, element 20 (compression means B).

¹¹ *Id.*, page 15, line 13 - page 16, line 7.

¹² *Id.*, page 15, line 13 - page 16, line 7.

¹³ *Id.*

¹⁴ *Id.*, page 6, lines 18 - 23.

According to claim 9 of the invention, it is disclosed that wherein the compression processing corresponding to the plurality of radiation images is represented by $1/m$, where m is an integer less than or equal to 10^{15} .

¹⁵ *Id.*, page 8, lines 20-24.

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 2, 5, 7-11 and 13-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Adachi in view of Ohara (U.S. Patent Application Publication Number 2001/0038707).

VII. ARGUMENT

Claims 1, 2, 5, 7-11 and 13-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Adachi (US 5,151,795, hereafter, “Adachi”) in view of Ohara (U.S. Patent Application Publication Number 2001/0038707, hereafter “Ohara”).

“To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.”¹⁶ Section 2142 further states that “[t]he initial burden is on the examiner to provide some suggestion of desirability of doing what the inventor has done.”¹⁷

Claim 1 recites:

A method of compressing image signals, comprising the steps of:

- i) obtaining a plurality of radiation image signals respectively representing a plurality of radiation images of an object, which radiation images have been formed with several kinds of radiation having different energy distributions,
- ii) obtaining an energy subtraction image signal, which has been formed from the plurality of the radiation image signals, and
- iii) performing reversible compression processing on the plurality of the radiation image signals and irreversible compression processing on the energy subtraction signal.

¹⁶ MPEP §2142

¹⁷ *Id.*

wherein the energy subtraction image signal is compressed with a compressibility higher than the compressibility with respect to each of the radiation image signals.

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness, as all of the elements of claim 1 are not taught by the applied references, taken either alone, or in combination with one another, in violation of the third requirement of MPEP §2142. Specifically, Appellant submits that Adachi fails to teach or suggest the use of an irreversible second compressing process.

In the Final Office Action dated September 19, 2005 (hereafter, "Office Action"), the Examiner alleged that "Adachi as applied above discloses that irreversible compression of image signals is commonly known in the art (col. 1, lines 40-41.)"¹⁸ However, the portion of Adachi cited by the Examiner is found in the background of the invention, and states that irreversible compression is undesirable because "the image quality of an image reproduced from the reconstructed image signal becomes lower as the compressibility is increased."¹⁹ Based on the above passage, Appellant submits that the cited portion of Adachi teaches away from using irreversible compression within the framework of the embodiments of Adachi. Additionally, the Federal Circuit has stated that the embodiment of the background and the embodiments of the reference cannot be combined without support.²⁰ In the instant application, the Examiner has impermissibly attempted to combine a teaching from the background of Adachi with an

¹⁸ Final Office Action, page 6.

¹⁹ Adachi, col. 1, lines 45-50.

²⁰ *Ex Parte Kramer*, 18 U.S.P.Q.2d 1415, 1416 (Fed. Cir. 1991).

embodiment of Adachi in order to find support for the Examiner's assertion that Adachi teaches or suggests the use of irreversible compression.

In the Advisory Action mailed July 24, 2006 (hereafter "Advisory Action"), the Examiner further argues:

Adachi as cited by examiner in col. 1, lines 35-50 discloses that irreversible compression of image signals is commonly known in the art and further teaches in the same disclosure that original image when compressed using a (sic) irreversible compression process would generate an image that is not identical to the original image. However, Adachi further discloses in col. 7, lines 28-32 that "In cases where the live images 45, 46 and 47 need not be reproduced, the image signals representing the masked image 41 and each of the subtraction images 42, 43 and 44 need not be added together" thus depicting that a reversible compression is emitted here and irreversible compression exists as generated image is different than the original image, therefore, the above disclosure as cited in col. 1, lines 35-50 and col. 7, lines 28-32 reads on the subject matter "performing irreversible compression processing on the energy subtraction signal."²¹

Col. 7, lines 28-32 of Adachi teaches that when live images need not be reproduced, the image signals representing the masked image and each of the subtraction images need not be added together. As seen from the above quotation, the Examiner interprets the this passage to mean that irreversible compression is being performed. Appellant respectfully disagrees with the Examiner's characterization of the teachings of Adachi. As noted above, in the background of the reference, Adachi discloses that irreversible compression should not be used because it causes deteriorated data reproduction and image quality under high compression. Thus,

²¹ Advisory Action, continuation sheet (PTO-303), fourth paragraph.

Appellant submits that the passage cited by the Examiner as allegedly disclosing irreversible compression actually recites reversible compression in which the extension of the compressed image data is not utilized, not irreversible compression. Therefore, col. 7, lines 28-32 of Adachi fails to teach or suggest the use of irreversible compression within an embodiment of the invention. Again, as previously noted, the Examiner is attempting to impermissibly combine an embodiment in the background with an embodiment of the Adachi reference.

Furthermore, the Examiner has failed to identify any prior art which discloses that irreversible compression is desirable. The Examiner alleges that “Ohara discloses that employing either reversible compression or irreversible compression when compressing image data is commonly known in the art.”²² However, similar to Adachi, Ohara teaches away from using irreversible compression, stating “[s]aid reversible compression is preferred since the degradation of diagnostic information, along with data compression, is minimized.”²³ Thus, neither Adachi, nor Ohara teaches or suggests using irreversible compression on an image subtraction signal. Consequently, even if the Examiner should produce a reference that would teach or suggest irreversible compression as being desirable, there would be no motivation to combine said reference with either Adachi or Ohara, as both references teach that irreversible compression is undesirable.

²² Office Action, page 6 (citing Ohara, paragraph [0223]).

²³ Ohara, paragraph [0223].

Based on the above, Appellant submits that claim 1, and for analogous reasons, claim 2, are patentable over the applied art, as the art fails to teach or suggest all of the elements of claims 1 and 2.

Claims 8-11 and 13-14 are patentable at least by virtue of their dependency from claim 1, while, claims 5 and 7 are patentable at least by virtue of their dependency from claim 2.

Claims 8 and 9 are Separately Patentable over the Combination of Adachi and Ohara.

Appellant also submits that claims 8 and 9 are patentable for reasons independent of their dependency from claim 1.

Claim 8 recites: “[t]he method according to claim 1, wherein the compression processing corresponding to the energy subtraction image signal is represented by $1/n$, where n is an integer greater than or equal to 10.” Claim 9 recites: “[t]he method according to claim 1, wherein the compression processing corresponding to the plurality of radiation images is represented by $1/m$, where m is an integer less than or equal to 10.”

Claims 8 and 9 specify certain compression ratios. The Examiner contends that this is a matter of design choice. To the extent that selection of an individual compression rate may be a matter of design, neither Adachi nor Ohara teach the inter-relationships of the different compression types for the different image signals in conjunction with specific ratios. Therefore, Appellant submits that claims 8 and 9 are patentable over the applied art, as the references fail to teach the limitations recited in claims 8 and 9.

VIII. CONCLUSION

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: December 20, 2006

CLAIMS APPENDIX

CLAIMS 1, 2, 5, 7-11 and 13-15 ON APPEAL:

1. A method of compressing image signals, comprising the steps of:
 - i) obtaining a plurality of radiation image signals respectively representing a plurality of radiation images of an object, which radiation images have been formed with several kinds of radiation having different energy distributions,
 - ii) obtaining an energy subtraction image signal, which has been formed from the plurality of the radiation image signals, and
 - iii) performing reversible compression processing on the plurality of the radiation image signals and irreversible compression processing on the energy subtraction signal,wherein the energy subtraction image signal is compressed with a compressibility higher than the compressibility with respect to each of the radiation image signals.
2. An apparatus for compressing image signals wherein:
 - a plurality of radiation image signals respectively representing a plurality of radiation images of an object, which radiation images have been formed with several kinds of radiation having different energy distributions, are obtained,
 - an energy subtraction image signal, which has been formed from the plurality of the radiation image signals, is obtained, and

compression processing is performed on the plurality of the radiation image signals and the energy subtraction image signal are compressed,

the apparatus comprising;

a) radiation image signal compressing means for performing compression processing on each of the radiation image signals with a reversible first compressing process, and

b) energy subtraction image signal compressing means for performing compression processing on the energy subtraction image signal with an irreversible second compressing process,

a compressibility in the second compressing process being higher than the compressibility in the first compressing process.

5. An apparatus as defined in Claim 2 wherein the compressibility in the first compressing process is set at 1.

7. An apparatus as defined in Claim 2, wherein the first compressing process is an irreversible compressing process utilizing a compressibility lower than that used in the second compressing process, and

wherein the second compressing process is an irreversible compressing process.

8. The method according to claim 1, wherein the compression processing corresponding to the energy subtraction image signal is represented by $1/n$, where n is an integer greater than or equal to 10.

9. The method according to claim 1, wherein the compression processing corresponding to the plurality of radiation images is represented by $1/m$, where m is an integer less than or equal to 10.

10. The method according to claim 9, wherein the compression processing corresponding to the plurality of radiation images is an irreversible compressing process.

11. The method according to claim 1, wherein the compression processing corresponding to the plurality of radiation images is an irreversible compressing process utilizing a compressibility lower than that used in the compression processing corresponding to the energy subtraction signal.

13. The method according to claim 1, wherein the compression processing corresponding to the plurality of radiation images is an irreversible compression process, and

wherein the compression processing corresponding to the energy subtraction image signal is an irreversible compressing process.

14. The method according to claim 1, wherein the compression processing corresponding to the plurality of radiation images is a reversible compression process, and wherein the compression processing corresponding to the energy subtraction image signal is a reversible compressing process.

15. An apparatus as defined in claim 2, wherein the first compressing process utilizes a compressibility lower than that used in the second compressing process.

EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

Appellant is not submitting any evidence.

RELATED PROCEEDINGS APPENDIX

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

There are no copies of decisions rendered by a court or the Board to be submitted.

PATENT APPLICATION

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Takeshi FUNAHASHI

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Examiner: Ashutosh UPRETI

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**SUBMISSION OF AMENDED APPEAL BRIEF
IN RESPONSE TO NOTICE OF NON-COMPLIANT APPEAL BRIEF**

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Notice of Non-Compliant Appeal Brief, submitted herewith please find an Amended Appeal Brief. It is believed that no fee is due. However, the USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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CLASSIFICATION NUMBER

Date: December 20, 2006